Menlo Park Notebook #50 [N-80-04-17]

This notebook covers the period April 1880-May 1885. The first part of the book dates from 1880 and contains notes on ores received and assayed by Edison and his chemist, Alfred Haid. The second part of the book was used in 1884 and 1885 and contains notes and drawings by John Ott relating to ore milling, along with notes and drawings by Edison, Ott, and Martin Force relating to storage batteries for miners' lamps. The book contains 282 numbered pages.

Missing page numbers: 1-2.

x E-172 N-80-04-17

April 17 1880

Recd from Cummings Oroville.

2 pkgs - one of pyrites in quartz which he says there are plenty of 10 miles from Oroville. & asks if they would be suitable for making sulphuric acid

Wants report of assay.

Not auriferous. Not fit for burning

The second pkg is bag black sand from ground by geo Springer 1/2 mile from Cummings office. Says can control the property, parties would like know result = Much gold & platina

By glass panning 4 flakes gold & colored red stuff plenty mercury

Sand quite magnetic will
see what proportion is magnetic

pkg from Thomasville N.C.
Came today -
get result Nothing

2 men A W Harris came
on 14th - brought 3 samples
from N.C. one iron - 1 pyrite,
1 mud - address 60 Bowen st
~~Provo~~ Providence R.I.
result only trace [illegible] in
Each sample =

6

Mr. Renzie Bridge
P. C. Renfrew Oregon.
Black Sand. Much Gold.

W. A. Cooler 24 Grant
Sends a piece of pyrites
N.Y.
in question. Nothing

S. Pickham 202 West 23rd st
Tellurium ore, N.Y.
from 100 gm. 0.130 gm Gold
= $ 686.4 per ton

W. H. Gano & Co, Room 30
Times Bldg. Chicago.
Black sand containing auriferous
pyrites. Gold little but per-
haps enough to work it.

From Mathews, Riverside P.O.
Co. County Colorado
traces Gold

N. P. Mining Investment Co.
Platinum?
Nothing.

16/4 N. Y. & Colorado Mining Co.
Little Gold only, not suitable
for our process.

20/4 Felix Agnus. Sends
tailings and dry pulp.
Poor results on small scale.
might be tried on larger scale.

Kettle Hole Slumbago
from A. T. Emery Nothing.

F. Gaebert Sutter st. 1403
San Francisco. Black Sand
small traces Gold

8

T. M. Newers, Jr. Stevenson
Saint Paul. Copperselfide
traces Silver.

Bottom of Tunnel by Birch ~~[illegible]~~
3 lbs. sifted out of 8 lbs.
6.610
6.598
0.012 Gold

0.012.2000
3
12
2000
3 | 24,000 | 8 . . . gr.
per ton

31 | 160 | 5.
155
5

Nice range
by 5 lbs. after
crushing yielded
$0.50 ton

31 | 20.8
31

31 × $20
1 8

$5.100 per ton

H. P. Brother Nothing
suitable for our purposes.

Ellis. Mercury. traces
of Silver. No Gold

Bloomfield. 2 specimens
the ones marked a black
shell from North Bloomfield
Mo-Mg. Co. Tunell contains
Gold $1½ to the ton.
The other one Nothing.

Newers & St. Paul.
Copperselfide

Delvan Peck, Silver & Gold mine
Colorado. Copperpyrites
traces Gold

Nelson Gold mine County
Ward District, Boulder Co
Colorado, Colavan Peck
Propr. Trans Gold

Caldwells Store Gorlorp Co
Texas. Mrs. T. A. Livingston
Nothing.

Jul Wagner Las Vegas
Ans Mines. Nothing.

G. H. Bennett with Lunt
April 8th 80 Blackburns, County
Tex Thomas & T.
Molybdenum Sulfide.

Emery, Kelton Utah 1
Plumbago. Nigrolle

Bryon Tyson Gold run Colo
says that he
thinks "Notable pyrites"
The pyrites are not auriferous
but there is some coarse
Gold among them, besides
a great deal of amalgam

F. E. Kinsman 46 E. 14 St
Specimens of Copperpyrites
containing sufficient Gold
to work them.

G. B. Roth. Pyrites, little gold.

Nov 1. Tyler Lehigh Gold run
Visit by Mr. L. considers too little gold
to work them.

J. M. Rayborn Corvallis Oregon
different specimens of copperpyrites
containing Gold worthwhile to
outsiders. Have no letter
Mr. Neel

John L. Welch, Ashland
Lackawanna Co. Pa.
Black coral. Gold and Hg.
in the form of cinnabar.

Mr. Williams 723 Chestnut St
St. Louis. 5 pounds placer
dirt from Idaho Colorado. Only little Gold

J. M. Wilcox Anthony
Plain Sand

Fields, Ironwood, Mich.
Nothing.

H. Richard Mugg 24 West Bridge
Street Troy. $352 per ton

No 1 -
F E Kinsman, Sulphuret
wants test =

No 2 Mr. Schuyler
Nevada City, Cal.
Murphie Mine
average ore - some free gold
Copper pyrites also non-antimony
arsenic - Little Tellurium & Selenium -
Silver. 20 pc free gold - Silver
30 pc remainder. 1/3 of 1 pc of
the whole metallic Copper in
form of Copper pyrites =

Tellurgold A No. 1.

500 grs. in mass.

3.612
3.335
0.277 in 500 grs.

1.108
12
2216
1108
13,296

500 : 0.277 : 2000 : x

0.277/4
1.108 ℔ = 13.296 oz

13.296
20
5,920

$ 265.5 ton

Tellurgold No. 1/11, 2 500 grs

3.648
3.612
0.036 in 500

500 : 0.036 = 2000 : x
2000
500 / 72000 / 0.304
1500 / 12
2000 / 608
304
3,648

3.648 oz per ton

McLaughlins ores sent May 19
1880 —

No 14 - Henrietta Goat, plenty mercury saw no gold, but only used handful of sand on glass & test with sieve full -

No. 5 Powers Clean up. one sieve full 1/2 out rest panned then glassed some too small colors, very rich 1/3, free gold not amalgamated - rusty - rest mercury - all very fine will go through very fine seven letters be made very rich -

16

Mc. L. May 1880

No. 17. Pure sulphurets from Everetrans Mine near Truckee

130 gr. roasted ore = 0.313 cu
= $11.52 to the ton

451 gr. of this ore roasted down to 301 gr.

No 8. (Lava bed black sand) Very rich fine gold no amal grain - small handful on glass 30 colors fine - nearly all magnetic

No 9 — 2 colors (small). 1 handful on glass - nearly all black sand say 70 pc (could be nicely concentrated)

12 - very poor 1 small color 1/2 pan full — no Hg — Little black sand. 5 pc.

Nov. 8. Mrs L. Lewis bed flat sands

500 grammes.

Concentrated	234
Fine	221
Coarse	45
	500

for wet assay took of the Concent. 16 grs from these obtained 0.003 gr. Gold = 0.44 oz Gold per ton of 2000 lbs

the same by fire assay
0.5 oz Gold per ton
0.5 " Silver per ton

No 7 - ~~Offer~~ about 7½ pc 19 black sand after sifting about 90 pc. 3. colors small in ¼ pan full No Hg - ~~½ oz Silver to two gold.~~

No 6 - 50 pc black Sand - 2 colors in large handful in glass - No Hg -

3840
575
3265

575 / 3840 (6
3450
390

18.00
24.00
384

No 5 *. $46 to the tre

Total amount 8 lbs — 3840 grammes

sifted to 900 mesh. 873 grams

Lifted magnetically from the 267 "

also

Subtract sand lifted by magnet 31

~~Total~~

~~Leaves gold~~

267
31
298

Subtracted from 873
298
575 — in which is gold.

(18) total 3840 — sieve + mag leaves
575 grames with gold. or 6 1/2 times concentrated

No 5 * - one handful of the 575 -
grams gave me glass 20 or 30
colors + lot of small colors -
there was lot of mercury +
amalgam - gold has rusty
spots or rather a fluorescent
porous quartz colored reddish
yellow - I now put it into
a paper box marked 5 *
575 grammes lot - but there
is not that amount after
my handful was taken
out

3840 gr. down to 575
the 575 contain $ 39.86 the ton

30 $\frac{0.0025 \cdot 2000}{30}$ 0.166 $\frac{12}{36.72}$ $\frac{166}{1992}$ $\frac{20}{39.840}$

$\frac{0.0025}{30 \,|\, 50000 \,/\, 0.166}$ $\frac{2000}{20}$ $\frac{20}{146}$

No 12 -

Coarse	3700
Sifted.	990
Magnetic	18
	4708.

Scarcely any if any gold in Coarse

No 14. -

Coarse	1860
Sifted	1885
Magnetic	70
	3815

There is very little gold in this - little amalg ~~Hg~~ - gold exceedingly fine -

Coarse no gold some

Dry Creek Tailings

No 3 – 500 grammes

taken =

There was lifted by magnet from this – 190

Leaving 310 grammes containing the gold – a curious thing is the iron magnetic is black, I found that a stronger magnet took out more, & I think a very strong Electro mag would take out still more

3 gr. gold 0.005 per. gold = $80 ton
+ 1.5 milligr. of 1 3/10 ounces silver per ton

Regular No

No 3

From RC Welch.

Redwood California.

Pkg. says can obtain millions of tons -

OK

2/3 of this is magnetic - it is very rich in exceedingly fine shot gold just the thing for our magnetic process:

~~Both~~ Little bag was empty when I got it

No 4 - Black Sand from

Of J McMillan Paris Ky

80 pc magnetic OK rich in gold but it was all amalgamated

Them where Ag came from

30

No 5 =

John D. Daley -

Newport, Benton Co

Oregon -

DC

Beach sand, black, 1/4 - easily lifted by magnet, 1/2 by an electromagnet & 95 pc by large electromagnet, contains Hg & poss amalgam also exceedingly fine scale gold finer than eye of needle probably be just the thing for our magnetic process if we can alter trajectory of weak magnetic particles

Over

31

He says away from the
beach there are lots of black
sand streaks — promises to
send more samples also a
sample of what they call
platinum = Write him say we
can work the pure black sand
as per sample without water,
but much white sand in black
sand is fatal to economy
of the process, only [illegible]
1/5 [illegible]

No 6

From H Rickard. Sample # 352 Tex

OK Fort Bridger.

Black sand. looks like Oregon sea sand but finer =
40 pc magnetic = extraordinarily rich in flour gold perhaps
in 1/2 handful or glass
there could 5000 Colors
say 300 milligrams gold
write for particulars how its
occurs quantity etc = NO Hg
ask if sample was panned
down — amalgamated needed
with Hg —.

C A Dickerson
Lodi, California (7) 03
San Joaquin Co —
small sample gold
some large 1/16 across good
flour gold —
says he sent 2 pkgs - write
we only need small paper
write him to send 3 lbs
clay also 3 lbs gravel
from both beds by mail,
it goes as 3rd class matter
Say that the practice we
have lbs for working
amalgamation black sand
concentrating flour gold say
be sure to put name on
sample

Sample from No 8

J M Riggs

Dos Cabezas

Arizona Territory

No Letter - its quality with few scales of pyrites -

No use to us -

W C Ingles. No 9

Knoxville Tennessee

Nothing

OK

No 6 * mcL =

1336 — alloqelter.

Coarse — 894 —

Magnetic 185 —

Containing Gold 277

handful on glass gave 2 large scales, and several microscopic colors, only little Hg. = about 50 grains more could be taken out with strong magnet.

No. 6 — Some silver too small to weigh — traces gold —

No 7 * McL

Altogether.

Coarse	700
Magnetic	246
Concentrates	219

2 Scales gold - considerably

Hg:- about 50 oz ounces mass

magnetic could probably be

taken out with strong magnet

Dr A. J. 1/2 oz. Silver Traces Gold

No 10 – Sluices –
Tailings =

Mostly fine = but mixed with
1/5 & 1/4 inch quartz pebbles –
poor only 2 large & several
small colors per 1/2 pan = considerable
pyrite = Don't think it would pay
Except concentrate with water =
Clayey = ~~Dr H~~ = No gold – 1/2 oz Silver per ton

No 11 Quartz (Brownish) from
Sluices = Crushed & panned
is rich in gold – fine, plenty
pyrite = Mostly free gold somewhat
~~A~~ coated with the yellow stuff –
there is pyrite, Gilth & another
heavy sulphide somewhat
malleable = probably could
be worked together Roasting
J Vor

No 11 Columbia 4 ✓
Hand assays found
fine pect 3 oz Gold per ton
coarse pert 1/2 oz " " "

No 12. Ad-Mailliard
San Rafael. Marin Co
Cal.
OK
Nothing, but 2 pieces good
by glass. Dr H assays it -
has lode 3 miles 50 x 40 -
Rebellions - will send 100 lbs wants
make arrangement with me - let him
know result. Hand assay
small traces gold

Slungis
Largi candle box
full Red Tailings
DrH = Only traces Silver & Gold.
OK

Steele, Santa Barbara Co.
DrH. 2 oz Silver per ton no gold

Waters = San Francisco —
DrH = 3 oz Silver per ton. OK

Rapp — County Clerk of Chicago —
DrH 122 oz Silver per ton OK
Trace Gold

~~C. P. Teer~~ No 13

Scottish Mining & Smelting Co
Salina, Boulder Co Colorado.
Sample of crushed & roasted
telluride ore, wants us to try
our hand at it =

2.8 oz Gold
1.2 " Silver.

OK

No 14 – 1/2 oz Gold
1/2 oz Ag.
Black Sand from
Plumas Mining & Water Co
Plumas Co
Spanish Ranche
California

OK

~~no Au Ag~~ has some
mercury & probably some
amalgam – There are several
pieces ~~silvered by~~ g
Ag – Would pay us
splendidly if it was as
good as sample as this is
nearly all magnetic
large grains –

No 15 = 3/8 oz. Gold
1/8 " Silver.
In box - no name -
~~State~~ with pyrites -
has letter with. address
of C A Bulkley Esq
Granville Washn Co
NY
Postmark from Hartford Conn.

No 16 = 1

Jm box blacksand

from ——— Seal mt.

Harkness Bankers

Ogden Utah =

No free gold has Hg poss

amalgam – Dr H says.

Little gold – its good

sand for magnetic precipitation

OL

No 17

Pkg from W M Dennison
Sparta
Union Co.
O/C origin
Good magnetic sand
Rich in gold fines
Class for our process.
Dr H = Rich in gold but too little
material for quantities on my

60

No 18 36 oz. silver per ton 67
4/10 oz. gold per ton.

Newton Duncan
Postmaster

OK Tooele City Utah.

Tin box of ores, look like Copper
ores - 66 oz silver per ton
[illegible]

No 19 — Long box. 3 compartments
1 2 & 3 = No 1 — Mill Tailings — No 2
Tailings mixed with Quartz Stone
No 3 — Some Rock also Earth =
from Young Stockton son of
Cons Stockton Trenton N.J.
from the South = pyrites = considerable
very fine gold — about like
Cons Virginia Mill tailings = very
little amalgam ~~+ Hg~~ = we could
do nothing with the Earths
except perhaps an Chlorine
process work, am trying it now —
Dr H will assay the rock =

Sayre = No 20
Danbury Conn

Same man that had tungstate of lime = worth assay –
only traces of Gold & Ag.
The last one in bag also

No 8 McL. Lava bed #3. 67

Concentration:

500 grams, all —

221 - Magnetic.
234 no magnetic
45 Coarse
500 -

assays - non mag. 0.447. oz
per ton gold - wet =
Same by fire assay 1/2 oz gold
1/2 oz Silver =

221 magnetic assayed
gold. 0.0015 gramm - gold
probably picked up by particles

68.

3.45

69

José M Villa No 21

Care of D de Castro & Co

54 William St

pyrites - heavy -

1 specimen - 6 4/10 oz Ag per ton

1/10 — oz gold

No 2 - 1/2 oz Ag - 1/10 oz gold

No 22

Mackay - Comstock Tailings

3 7/8 oz Silver $4.45 - Silver

1/8 oz gold. $2.60

$7.05

No 23

Husbands

7 samples —

Everyone of them contains gold and silver but only in small quantity except No. 2 which is a little richer amounting to 1/8 oz of gold per ton

OK

No 24 Pure black sand from H Stuff. Lambs Bridge California. Enormous quantity of platinum 1/4th of entire bulk some gold. No letter see about this, plat nuggety =

OK

25 =

Bag sand from W C Martin

From San Francisco. OK

Drill = 1 1/4 silver - 3/4 oz gold ton

not enough magnetic for us - ask for full information

26 - Hall. from Tarryall Colorado

Bag concentrates ~~& Mother gravel.~~

neither rich, Mother E. has some

Hg & amalgam — Scarcely any

black sand its good hydraulicking

gravel will assay for silver

OK

27. F E Matteson.
Danville
Contra Costa Co
Cal.

Sends 25c return postage, requests letter result assay. Little pkg black sand & 3 or 4 rocks, in tin box — letter unit, sand requires strong magnet.

28
A. C. Barnard. Butte City, Montana
Black sand — nearly all magnetic
Very rich gold — just throw over process — gold free & very nicely saw by unit it must probably be concentrated — sand requires strong mag. 14 oz gold. 18 oz silver.

29 — @ S Justice " Azusa Los Angeles Co.
~~Azusa~~ California
~~Wharf~~

Black sand. very rich nearly all magnetic, ~~just~~ ~~thing~~ ~~over~~ process. ~~Dr~~ 2 oz gold 3 oz silver.

Louis Glass, Oroville —
Black sand 1 oz gold to ton =
Has pyrite Contains nothing

Farrel Mine.

No 3. Eureka Lake & Yuba Canal Co Consolidated 60 Pine st NY

Very rich in leaf fine gold saw little Hq - all Silica. while clean. looks clayey think its been sifted - 1 handful 8 colors

No 4 - Farrell, Ferro colored sand Hq - quite rich in gold 1 handful on glass 10 colors

No 2. Lots amalgam 2 or 3 pieces fine gold -

80

81

George Carman.

Ashes from Corbiere's claim

Also Tailings from ———

Ashes, 1/4 oz gold. 3/4 silver. Fire.a.

— make wet assay —

82

83

Higbee man with mexican,
placer sand - 4 oz gold 3 oz
Silver - per ton

Hedden 0/4 4/10 - Silver 1/10
oz gold = 0/4

Dr H = 1 oz au 33 oz silver - NO1

Dr H NO2 1/2 oz au 35 oz silver

From W Bennett,
ck of ore - Postmark obliterated
looks like. apache PASS. Bowie Arizona Terr

plumas Mining & Water Co
2nd sample - black sand
= perfectly pure black sand exceedingly
rich in gold some free in scale but
very many unamalgamable particles
and frosted with Hg but quality

Sticking to gold so it comes together to form amalgam - a beautiful and for our process Dr H will make fine assay -

Bag of Brons and Concentrations in shot bag marked from Forbestown, there is lots of rusty gold + quartz (yellow red) coated over with filamental gold - It is enormously rich. =

Bag with 2 samples from Baker Cty - Sent through Kourly - Bros -

3 pieces Rock from H. G. Maynard
Cheyenne Wyoming Terry Creek
Sent to Coulson Platinum
assay for Platinum Gold &
S.C.C. —

Quartz from W T Danner
Boulington Iowa —
Sent to Coulson Platinum

Woodchuck (Supposed) —
Black snake from Barnard Lettie
address for information ~~[illegible]~~
~~[illegible]~~ Mrs Dow 30 Upton St
Boston — Very Rich with Gold

88

89

Ore from John Bowmon.
Princeville Peoria Co. Illinois

J. F. Otto

May. 14. 1884

Made large Electromagnet and suspended between its poles. extensions with silk fiber the following Mettals and compounds

Ivory is directed with the lines of force without nearing eathe poles while suspended in cent the moment atempted to draw out of line it neared the nearst pole

Aluminum across the lines of force provided it being suspended direct in cent of lines of force, but by drawing it out of the lines of force, it nearing one or the other pole

J. F. Otto May 14. 84

Mt Quartz acted the same as Aluminum

Glass the same as Aluminum

Sulf Iron with the lines of forces the wire acting same as Aluminum having a slight stronger mag force

Zinc with the lines of force but attracted by the magnet when drawn out

Mica with the lines of force but attracted when drawn out

May 14. 84

Lead set itself up with the lines of force but was not attracted by either pole

Elder Pith with the lines of force and attracted when raised or lowered below cent lines of force

Gold with the lines of force, on being drawn out it neared either one pole or the other

Filled ~~the~~ small glass oblong bulb with Muratic Acid it took up the position across the lines of force when drawn out it neared the magnetic poles

J. F. Otto

94 Filled small oblong glass bulb with sulphuric acid and suspended it, and acted same as Muratic acid

Acetic acid the same as Muratic acid

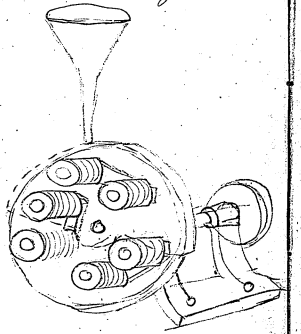
J. F. Pitt.

95

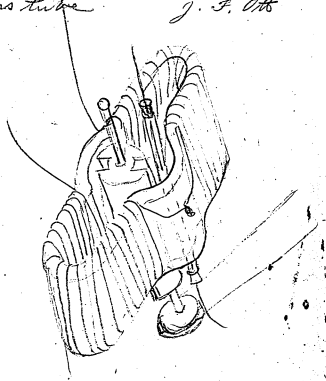
May 16, 84.

Made model for Ore Milling

J. F. Otto



98. One Milling suspended small piece of copper in glass tube. J. F. Ott



Solutions used in Storage battery experiment for Meyers Lamp.

#1
#2 Red fluid
#3 ~~Bisulphate of potash~~ Hyposulphite of Soda
#4 ~~Hydrocellulose~~ nitro prusside of Soda
#5 ~~Cyanide~~ " " " Potassic Ch.
#6 Manganese sulphate
#7 ~~Potash ferro Cyanide~~ Mercl
#8 Phosphoric Acid
#9 Mangan + zinc sulphate.
#10 Glacial phos. Acid.
#11 Hyperphosphat mangan + glacial phos. Acid
#12 Oxide zinc + glacial acid.
#13 Mangan sulphate + glacial acid
#14 Ferric Cyanide.
#15 Boracic Acid.
#16 Mangan Carbonate + glacial Acid.
#17 Stannate Soda.
#18 Phosphate Soda.
#19 Soda acetate
#20 Acetic Acid.
#21 Acetic Acid + phosphoric acid + glacial + water

" 23 Arsenic Acid strong
" 24 Sulphate of Zinc + Sulphate Iron.
" 25 Citric Acid.
" 26 Sulphate of ammonium & Sulp of Z.
" 27 Oxalate " " & K. ac. Ox.
" 28 Pyrogallic Acid.
" 29 Tannic Acid.
" 30 Do Do + phosphoric acid gla-
" 31 Glycerine + Common Salt.
" 32 Do + Sulphuric Acid.
" 33 Do + Phosphoric Acid (glacial)
" 34 Oxalic acid.
" 35 Do + Phosphoric
" 36 Tartaric Acid.
" 37 Do Do + phosphoric Acid (Gla)
" 38 Alum
" 39 Do + phosphoric Acid.
" 40 Do + Manganese Sulphate.
" 41 Ammo. Sulph of Iron + Zinc Sulph
" 42
" 43 Arsenate Manganese + Zinc Sulphate
" 44 Barium Chloride
" 45 Do Do + Manganese Chloride
" 46 Sulphate of Iron
" 47

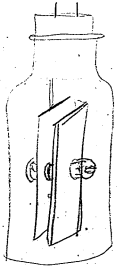
cont'd

April 13 1885

T A Em M Forer

Experiments on storage batteries for Miners Lamps.

Lead Electrodes. inch wide. 3 inches long + $\frac{1}{4}$ inch apart. $\frac{1}{16}$ thick



102 48 --
49 --
50 - Carbonate of Potassium
51 Bi -
52 Sulphate " -
53 Bi - " "
54 Bromide of "
55 Permanganate - "
56 Sulpho-cyanide - "
57 Ferro-cyanide - "
58 Hypo sulphite - "
59 Arsenate of "
60 " " " + Phosp. Potass

Storage Continued April 13 1885 OW

Tae
Mr. Tree

No 1

Lead & Lead - Ordinary Red fluid Bichrom —

3.35 PM - april 13. deflection on strap

50 - By mistake 3 cells chgg was used for 2 mins now changed - deflen 27 strap ~~at~~ At 345 — disconnected & put through 2 ohm Coil gal — gave 50 then down to 10 in 10 seconds 20 seconds gave 4 - N.G —

No 2

Lead & Lead - Chromic Acid & Sulacid —

22 on strap 348 pm — ~~pulsy~~ in 10 seconds 15 = Chrgg with 2 Bichrom Cells — 30 seconds goes to 11 on strap = stays at 11 — Disconnected at 358 — 15 on strap in 5 seconds 10 in 5 seconds 8. 5 in 20 seconds - N.G.

10 X

Thomas Gulmann April 13 1885 10 J
M. A. F.

No 3 —
Lead & Lead — strong Solution Bisulphate
Potash = at 4.02 pm — strap gives
8 deflection. ~~strap~~ seems
deflection at 4.05. discontinued at
4.12 pm — ~~—~~ in 2 seconds 10 deg
on 2 ohm coil. 8 seconds 5 deg
20 seconds 3 deg = Reversed & Reding
4.14½ pm 8 deg on strap at 4.16 — 10 deg
at 4.20. = 2 seconds 12 — 10 seconds 5 on 2 ohm

No 4 Phenomenon
Lead & Lead Hyposulphite Potash,
on at 4.33 pm — def on strap 6.
Solution almost instantly turns
black at top in one or 2 seconds ~~strap~~
this black clouds so thick that by
shaking bottle its almost like ink,
poly go-fleud for chemical telegraph,
one side pale coated heavily with
white sublance, viscous & dont rub off
= perhaps sulphur. deflection at 4.41
2 on strap, this coating or duality
insistencies. off at 4.42 = in 2 seconds 8
on 2 ohm coil. in 30 seconds 5 on 2 ohm
1 minute to 3 on 2 ohm coil

Storage Continued. april 13 1883 — 107

M N F

5 =
Lead Head - Cyanide Potassium
On at 4.24. gives 12 m strap.
off at: 433 - 10 m 2 seconds.
3 m 5 seconds 1 m 8 seconds

6 Sulphate Manganese
Lead Head - on at 445 - strap 4
deg - 4 deg at 455 - off -
30 deg 2 secs - 15 at 5 secs -
30 seconds 10 deg - 60 secs - 5 deg
m 2 ohm coil - 3 minutes 3 deg
m 2 ohm coil -

108

April 13 1885

No 6 Continued Tab 9

Lead Peroxide MMF

In discharging found that big Cl plate got blackened (PO) & partially the discharging recharges it thus giving C EMF + poor results the peroxide 6 Cl cole after discharg appears as 6 Cl cole + (the cole as it was being discharging) I now reverse direction at 5 o'clock something peels off in flakes & drops to bottom - deflection on strap 4 deg - off at 5.05.

2 seconds 30 5 seconds 20.
10 seconds 15 - 20 seconds 11
25 seconds 10 - 30 sec 9 - 35 sec
8 - 40 seconds 6 - 50 seconds 5 -
1 min 5 - added strong
Sulacid - Recharged - 5.15 - pm -
Recharge - The Sulacid cleans plates & dissolves the flakes at bottom - deflection on strap 12 -

P.T.O.

April 13 1883 #1

6 Continued Lead & Lead

at 5 20 - strap gives 20 deflen -
off at 520. 2 sec 20 5 seconds
15 - 10 sec 10 - 15 seconds 7
20 seconds 6 25 - seconds
4 - 30 seconds 3 -

No 7 - Lead & Lead
Ferrocyanide of Palladium
accidentally slightly acidulated with SO_4
Strap - 5 - at 5.24 pm -
at 528 - 7 def - off at 530
Defln 2 on 2 ohm Coil S S
N.C.

112

April 13 1883
Test
M. H. T.

Lead & Lead

No 8 — Double Sol Sul Zinc
& Manganese 5,34 pm —

Strap diff - 10 deg —

5-44, off 5 seconds 70 — on 2 min. 5 sec.
10 seconds 60 — 15 secs 50,
20 seconds 45 — 25 second 35 —
~~Force~~ 1 min 32 — 1½ min
30 — 2 mins - 23 —
2½ minutes, 19 — 3 minutes, 15 —
3½ minute 14 — 4 minutes 12
4½ minutes 11 — 5 minutes, 10
5½ minutes 9 6 minutes 8
6½ minutes 8 7 minutes 7
8 minutes 6 — 8½ minutes 6 deg

April 13 1885 — 115

M. M. Fisher

No 9 Lead + Lead, Hypophosphate soda 6 pm: 4 on strap one plate turns blocks almost instantly, off at 6.09 — Runs down nicely to 2 on 2 ohm coil & zero in 10 seconds —

April 14 1885 —

10 — glacial phosphoric acid. Lead + Lead — 11.51 AM. 12 on strap. 11.55 — 10 on strap — at 12 M — 8 on strap = off —

1 sec 15 — 5 — 5 sec 10 on 2 ohm coil notice peroxide. Very brown mat block as usual, 1 min 9 — 1½ min 6 —

Apl 14 1885 Tag 117

10 continued, Reversed discharge
& put on at 12 03 — 8 m strap
off at 12 12. 1 sec 25 —
5 sec 15 — 10 sec 10 — 1/2 min
10 — 1 min 8. — 2 mins 6. —
2 1/2 — 5 — Every bit off the
peroxide reduced plates.
perfectly clean after discharge
the seems to be big advance
over SO4 — Zero in 3 mins.
This should be investigated
by constructing large battery
after white lead powder falls bottom cells — Brd

No 11 —
Lead & lead — Strong Sol. Red
Prussiate Potash. Strap "24"
Violent action — precipitate in great
volume falls from plate connected
to Carbon pole 12 25 PM —
off at 12 26

Apl 14 1885 119
Tag

11 Continued, on 2 ohm first zero then rises to 5 – then 3 – precipitate is a yellow – volumin[illegible]

12 – glacial phos acid (lead + lead) strong saturated with Hyperoxide Manganese, Blue Solution. Hyper is green white powder – this probably makes phosphate manganous – 20 on strap

1247 pm – Both plates Browned one very strongly, other weakly. Stands at 20 on strap right along – on shaking few flakes Brown stuff fall off bottom plate too rapidly changed off at 1253 = 13 on 2 ohm coil 5 – seconds 10 seconds 24 – 30 sec 20

This hyperoxide is only a Copy of 2 / 1
Salt put in battery by mistake

12 Cartesian, 1 minute 19 –
1 ½ min. 18 – 2 min 17 –
2 ½ min. 17 – 3 min 17
3 ½ minutes 15 – 4 min. 14 –
4 ½ min. 13 – 5 min. 11
5 ½ min. 10 – Reversed
direction strong 20 – 1259.
off 104

Phenomenon

at first sends powerful effects
Current as it should do but this
almost instantly stops runs to
2.250 + gives for instant 50 in
opposite or same direction as
Chg battery this gradually
runs down as above – 1 minute
20 w/ 2 ohm Coil

April 14 1865 — Th 2 3

No 13 — Mixture of ~~glacial phosphoric~~ a Copper salt
+ Hyper oxide Manganese —
also of phosacid + oxide Zinc
15 on strap. 1.13 pm — m. 1½
mins. 15 on strap — off at
117 — Same phenomena of
Revivals — 30 on 2 ohm
on 5 secs 20 10 secs 15
20 sec 15 — 25 sec 12
30 sec 12 35 sec 12.
60 sec 12.

Lead + Lead

No 10 - changed - phosc acid glacial + dd Sul Zinc -

133 pm - Strap 6 -

1/2 minute strap 9 - Carbon plate dont seem to Blacken - I guess Sul a liberated there disabling the peroxide making amount,

off 135 = 90 or 2 ch

Cool 10 seconds 82 - 25 -

seconds 60. 40 seconds 35 -

45 - 25 - 50 sec 20 53 sec 18

57 sec 15 - 59 sec 10 - Rapidly goes down Recharge.

138 pm - strap at 1st 35 -

Rapidly goes down to 5 - Solution becomes milky probly from phos Zinc, strap in 1 min 10 -

1144 off 95 - 10 sec 90 20 sec 90

April 14 1885 Tag 127

30 sec 90 – 40 sec 90 –

50 – 90 – 1 min 90 1½

90 – 2 min 80. 2½ min

70 – 3 min 60 – 3½ min

47 – 4 min 35 4½ min

24 – 5 min 18 – 5½ min

~~60~~ 12 – again put it

in with same free 504 –

Strip 1.50 pm 10 – Leguindez

white cloudy – 157 off

almost right angles more than 90 deflec

1 min 70 – 2 mins 55 –

3 minutes 38 –

April 14, 1885 — 1029

No. 14 —
Lead thread Soln of Sul Manganese &
glacial phos acid —
215 pm strap 7 — 1 mm
strap. 10 — off at 224

at 1st 80 — 25 — in 10 seconds.

20 sec 15. 30 sec 10 — 40 sec 5 —

No 15 — Lead thread Bracic acid —
2.32 pm 2 on strap 236 off

Zero — Nq

April. 14 1885 – T.&B.

16 – Lead & head –

Carb Manganese dissolved in Glacial phosphoric acid

on at. 246 pm – 5 on strap

~~off at 25 – 50 on 2 ohm~~

~~½ min. 50 – 1 min.~~

off at. 253 off 5 on

2 ohm runs right to zero

17 – Lead & head Sesquicarb Soda –

on at 258. 20 on strap

½ min 16 on strap. 1 plate clean other brown very quickly – 304 off

to 7 almost instantly

April 15 1885 JAE

18 = Lead thead Phosphate Soda
.6 on strap 1120 AM –
off at 1126 molarity runs
down to .5 in 5 seconds to 2
& then zero neg.

19 – Lead thead acetate Soda –
34 on strap 1129 AM.
Precipitate forms rapidly as
Hydrogen eliminated, Electrodes
dont seem to have peroxide on
but grey lead. 1132 AM. 30 on
strap – off at 1134 AM.
55 on 2 ohm coil 10 sec 40 20 sec
25 – 30 sec 20 40 sec 15 –
50 sec 10 1½ min 8 – Evaporates
precipitate –

April 15 1888 JAB/BV

Continued

20 - Lead thread. Acetic acid.
11 37 AM - 3 on strap - High
Resistance. Off at 11 43 reading

21 - acetic phosphoric acid
glacial 170 ohm. 15 at 1st on
strap goes in 3 seconds to 4
11 45 AM - off at 1150.
50. 10 sec 40 20 sec 37
30 sec 32 - 40 sec 30
40 sec 27 1 min 22
1 ½ min 20 2 min 15
2 ½ min 4 -

23. Lead Thread.
Arsenic acid string
Cmc — 15 on strap. 1158 am.
gas comes off both plates.
1154 20 on strap.
1201: off scale 10 sec 85-
20 sec 50 30 sec 57- 40 sec
55- — 50 sec 55- 1 min 30
1½ min 35- 2 min. 15-
2½ min. 10 -

25- Lead Thread.
Citric acid. 5 on strap
1206 pm — 1207- 4 on strap
1211 off 5 — 29

April 15 1885 Tue

28 Pyrogallic acid & salt,
dead head
1 30 pm - 2 ½ on strap
1 53 pm - 5 on strap

29 - Tannic acid & salt
20 at 1st 2 seconds 4 on
strap. 1 57 pm - 2 pm 3 ½
in strap - off at 20 5, 20
on 2 ohm - 5 seconds to 5
ng —

April 15 1883

30 Tannic & phosphoric glacial.

206 pm 25 at first in 10 sec

8 on strap off 212 pm 50-

10 sec 35 - 20 sec 29 . 30 sec

14 - 40 sec. 10. 50 sec

8 -

FROM THE LABORATORY OF
T. A. EDISON,
MENLO PARK, N. J.
U. S. A.

31 — Lead & Lead
Glycerine & mmm salt.
2 19 pm - 10 on strap -
20 sec goes to 3 on strap
234 pm off 10 in 10 sec 7
20 sec 5

No. 31 solution 2 mc & Copper
Carbon to Copper 7 on strap
530 pm — 532, 5 on strap.
Shaking goes to 7 —
off at 537 pm — off scale.
1 minute 85 — 2 mins 50
7 mins 7 on 2 ohm
Coil. Reverse putting
Carbon pole to Zinc
30 on strap

april 15 1885 Tag J -

31 Continued
5 45 pm - 30 on strap off
at 5 48 ½ pm - Zero
ng

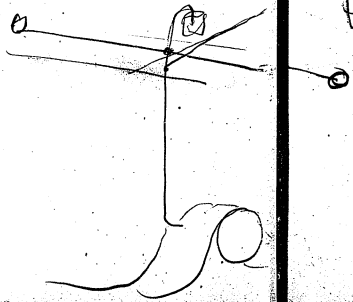
No 20 - acetic acid Zinc +
Copper + Carbon to Copper -
3 on strap 5 51 pm - off at
5 52 ½ Zero - plates
Zinc on Copper Reversed
plates Carbon to Zinc
3 on strap - 5 5 3 pm -
off at 5 5 4 - 10 on 20 ohm
ng -

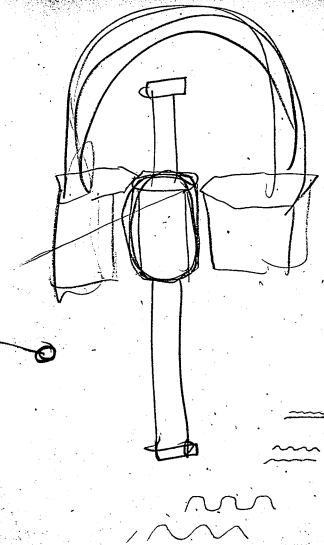
1010 – Copper & Zinc –

55 on strap Carbon to Copper
Enormous lot bubbles from Zinc
blue vitrol thrown down from
Copper – 1 min charge –
off scale. strong there to
primary battery very
strong but local action
Enormous

15 Boracic acid 1g with
Copper & Zinc

No 14 — Copper + Zinc. 50
on shunt. Carbon to Copper —
Blue vitriol Comes down
off after 2 mins.
off scale. Local action considerable
on zinc. shunt above 80
for over minute stop. Then
right along — evidently pressure
battery = 9 increase put
Carbon to Zinc. 40 on shunt
1 min charging —
~~Then~~ off scale goes 90 + over
+ gradually gets strong
Evidently a pressure
battery ing





April 17 1885 — 153

Experiment with 10 Lead plates 16 inch apart. 5-x 5 — square perforated in strong Solution of Sulphate Manganese & Sul Zinc: Deflection on strap 22 at 1 40 pm — at 155 — put it on short ckt through strap - 70 deflen on strap in 1 minutes 55 — in 2 mins 35 — in 3 min 24 — in 4 mins 13, put on at 2 pm — deflen 50 m/p min 35 — one min 22 — 2 mins 17. after 8 minutes 14 on strap

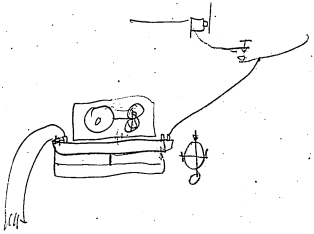
At 240-pm put on
small 1/2 cp Lamp
Bright red — Dropped to
dull red in 1 minute
in 3 mins below visible
Recharged at 245-pm
go down Town —
at 730 pm on return
strap shows 10 — I now
put small lamp on 1/2
c.p. through strap &
rate, Have no watch must
guess deflection 15 — on strap
other way - Lamp Yellow red

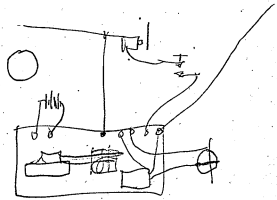
by clock m. other room at
738 pm when 9 put Lamp
on. Strap 13 Lamp little
dulled but still yellow 2
minutes afterward
at 756. Lamp Red,
strap 10. below red at
830. — 9 o'clock pm
20th Removed dressing
& put it on for charging
all night
My impression is that this
form is no avail

April 22 1885 ~~TAB~~ 159

Solution of Sul Zinc & Sul Manganese
Tinct Zinc - Carbon of battery
to Tin - Strap 17 ~~[illegible]~~
1145 AM - 1148 off
80 - falls rapidly to 50 40 30
20 15 10 8 in 20 steady
9 now remove - putting Carbon
of battery to Zinc 22 on
Strap. ~~[illegible]~~ 1 min
16 nothing

Zinc & Nickel in Sol of
Sulphates of Zinc & Manganese
1153 - 8 on strap
after 3 min 20 on 2 ohm
Coils runs down to 0
in 1/2 min ng -





April 24 1885. Tag —

Carbon + Zinc — Sol of Sulphates
of Manganese + Zinc — 838 14 minutes,
pm. — O. stamp 10 at first 5—
after minute — off at 852 —
first off divisions on 2 ohm Coil,
in ~~1~~ 1 min: 70 — 2 minutes
45 — in 3 minutes; 34
4 minutes 27 — 5 minutes.
23 — 6 minutes; 19 —
7 minutes ~~8th~~ 19 —
Shaking causes it to go
up — 5 or 6 degrees,
8 minutes — 17 — 9 minutes
14 — took it no further
Reached at 903 pm
14 on. Stop rapidly drop to 10
Chas Thomas —

April 24 1865 — 161

in minutes so goes to $6\frac{1}{2}$

on strap — great deal of

gas bubbles formed —

60/400 Hz
400

27th Apr. 1884

Storage Batteries – Lead & Lead

Solution #36 – Tartaric acid

Readings on

Battery only Step Acid Right	Left	Cell only	Time	Step acid	3/10 Ohm coil
35	35	0	3:00	8	
			:15	2	
			:30	—	28
			:40	—	20.
			:50	—	+1
			16	—	
			10	—	0.5

Solution #34 – Oxalic acid

		Nothing			
			3 23	15	
			33½	3	
			33	2	
			10 seconds	—	8
			20	—	4
			30	—	1
			40	—	discharge

Solution #39 – Alum & Phosphoric acid

		Nothing			
			35½	4	
			36	3	
			45½	2	
			6 seconds	—	20
			10	—	5
			20	—	3
			30	—	3
			40		
			45	discharge	

Remarks

Gas evolved in small quantity
No precipitate
No coloration

Gas evolved
No coloration

No coloration
Gas evolved freely

Strong Batteries – Pt & Pb

Solution #37 – Tartaric & Phosphoric acid / Sheet

Battery	Cell	Time	On Strip	On 3/10 cell
38439	resting	3h 53 min		
		53 1/4	11	
		54	5	
		4h 03	2	
		3 seconds		70
		10 "		30
		20 "		18
		30		17
		40		23
		50		23
		60		20
		90		14
		2 minutes		6
		10 seconds		5
		20 "		5
		3 minutes		5
		30 seconds		5
		4 minutes		5
		5 "		4
		6 "		3
		7 "		2
		8 "		1
		9 "		discharged

Remarks

Gas from one plate (negative)
Positive plate turned dark brown immediately.
No precipitate.

Brown coating entirely off at 9 minutes
No gas from either plate

172 #37 Repeated Pt & Pt

Battery	Cell	Time	On Step	On Coil
37936	nothing	4 19 1/2	4	
		20	2 1/2	
		23	2	
		29 1/2	2	
		4 seconds	80	On coil
		10 "	23	
		20 "	15	
		30 "	18	
		40 "	20	
		50 "	22	
	1 min	60 "	22	
		10 "	20	
		20 "	15	
		30 "	13	
		40 "	11	
		50 "	6.0	
	2 min	60 "	5	
		10 "	4	
		20 "	4	
		30 "	4	
		3 minutes	4	
		4 "	4	
		5 "	3 1/2	
		6 "	2 1/2	
		7 "	1 1/2	
		7 1/2	discharged	

173

Deposit immediately formed on positive plate
Gas evolved from negative plate.

No flaking or precipitate.

Charging & disconnecting the deposit immediately disappeared.

all deposit off

Strong Batteries Pb & Pb

174 Solution # 38 alum

Battery	Cell	Time	On Strip	On Coil
37	nothing	5th 24' 00"	5	
		20"	1	
		34"	1	
	4	seconds	70	On 1/2 coil
	10	"	10	
	20	"	9	
	30	"	7	
	40	"	6	
	50	"	6	
	1 min		5	
	10	"	5	
	40	"	4	
	2 min	"	4	
	2½	"	3	
	3	"	2	
	4	"	1	

Solution # 40 — alum & sulphate of Manganese

38	Not primed	5' 44' 10"	7	
		5-4	1/2	
	5	seconds	3	
	10		9	
	20		5	
	30		4	
	40		3	
	50		3	
	60		2	
	2 min		1	

Remarks

Gas evolved

Dark deposit = Easily formed

Deposit remains on plate (+)

Slight coloration immediately little gas.

Dark deposit formed like previous test.

Deposit remains after discharge

Strength Battery Pt of Pt
Solution # 44 – Barium chloride

Battery	Cell	Time	Steps	Coils
	Nothing	5 : 05	7 1/2	
		6 : 05	1/2	
		4 seconds		20
		10 "		6
		20 "		4
		30 "		3
		40 "		2
		50 "		2
		60 "		1 1/2
		70 "		1 1/2
		1 min 30		1
		2		1

very little gas
no deposit or coloration
of solution

Strong Battery – Copper + Copper
Solution #10 – Special Prep. Acid
Do. after

Battery	Cell	Time	On Strip	On Cond
35 + 4	nothing	8:40	23	
		:45	20	
		:54	14	
		5 seconds		23
		10 "		18
		20		10
		30		9
		40		7
		50		5
		1 min		4
		" 30 sec		3
		2 "		2
Solution #22				
	nothing	8:59	11	
		9:01	9	
		:09	6	
		4 seconds		60
		10 "		35
		20		27
		30		18
		40		16
		50		13
		1 min		11
		1 " 30 sec		6
		2 "		2

Rapid evolution of gas
with decoloration of copper.

Dark brown deposit on coloration
on one plate & gray on other,
no precipitate.

Deposit remains after discharge

Gas continued but very little dis-
coloration of plates.

Coloration black

180 solution #11 Copper + copper

Battery	cell	time		
28	Nothing	9:15	2 on	strip
27		20		
		seconds	4 on	coil
		20 "	3	
		30 "	1	
#15 Phosphoric acid				
	Nothing	9:20	1 on	strip
		34		
		5 seconds	4 on	coil
		10 "	2	
		30 "	0	
solution #15 – Boracic acid				
33	Nothing	9:43	Nothing	
7 35		:53	"	
		10 seconds	2 on	coil
		20 "	0 "	
Solution #25 – citric acid				
	Not priming	9:55	3 on	strip
		:56	2½ "	"
		10:05	2 "	"
		5 seconds	3.6 on	coil
		10 "	2.0	
		30 "	1.0	
		50 "	.3	
		1 min	1	

(8)

Darkened color on one plate.

Slight coloration of plate

No coloration –
Slight amount of gas liberated.

Both plates slightly discolored
Coloration remained after the discharging

182 Solution #33 around deus - Forks

Cu of Cu

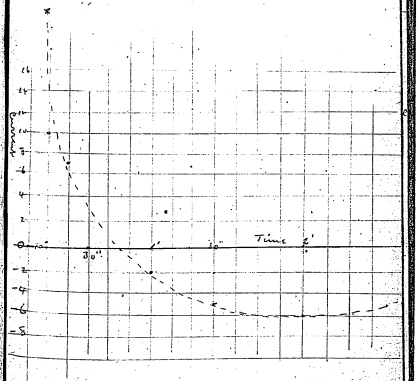
Battery	cell	Time	Deflection	
	nitrity	10 11 00	18	on strip
		30	8	" "
		12 00	5	" "
		21	2	" "
		3 seconds	20	on coil
		40 "	10	
		20	7	
		30	0 ?	
		1 min	-2	
		1 4 30 sec	-5	
		2 minutes	-6	
		3 "	-5	
		4 "	-4	
		5 "	-4	
		6 "	-4	
	nitrity	10 37	18	on strip
		37 30	11	
		42	7	
		4 seconds	22	on coil
		10 "	2	
		20 "	-7	
		30 "	-9	
		40	-9	
		50	-9	
		1 30 "	-9	
		2 minutes	-9	

183

Coloration before charging

Dark deposits on plates

No precipitate



184 Storage Batteries – Copper coppers

29th April 85

Solution #23 – Arsenic acid, strong

Battery	Cell	Time	Depletion
80 933	Test a primary cell.	2 : 43 : 30"	28 on strip
		45"	14
		44	8
		2 : 53 30	4
		3 seconds	40 on coil
		10 – – –	25
		20 – – –	10
		30 – – –	2
		40 – – –	0
		50 – – –	0
		1 minute	0

~~#28 Pure sulphuric acid.~~

	Plenty	3 : 15	6 on strip
		15 3 : 0	4
		28	
		seconds	on coil
		10 "	20
		20 " – – –	13
		30 – – – – –	11
		40 – – – – –	9
		50 – – – – –	8
		1' 20 " – – –	7
		2 – – – – – –	6
		3 – – – – –	3

Repetition of former experiment 185

Are plates slightly stained

copper-copper

188 Solution 29 – Lance acid

Battery	Cell	Time	Deflection
	1st primary	3h 3·3	5 on chap
		3·5	2 " "
		4·3	2 " "
		5 seconds	20 on coil
		10 "	9
		20 "	7
		30 "	6
		40 "	6
		50 "	5
		1 min	5
		2 "	4

14 Lance Cyanide

Battery	Cell	Time	Deflection
20.4.18	resting	3h 4·5	5 on chap
		4·9	4 "
		5·8	
		seconds	100 on coil
		10 "	15 "
		20 "	8
		30 "	5 "
		40 "	3 "
		1 min	3

21 – Acetic Acid

Battery	Cell	Time	Deflection
	resting	4h 0·3	2 on chap
		1·3	1 " "
		3 seconds	60 on coil
		10	55
		20	51
		30	48
		40	40
		60	30
		1 min 10	15
		2 "	10
		3 "	7

After frothy gas accumulated
slight discoloration of plates

Rapid evolution of gas from negative plate.
Both plates darkened, especially the one from which the gas was rising.
No precipitate.

Gas from both sides.
Slight discoloration

Solution #19 – Soda acetate (in dilu)

Bath	Cell	Time	Reflections
26929	Nothing	4" 24'	3 on strong
		34'	2 " "
		6 seconds	20
		10	10
		20	5
		30	3
		40	1

Solution #42 – Barium chloride + Hemp

	Nothing	4" 45'	10 on strong
		45" 20"	8 " "
		46	6 " "
		55	3 " "
		3 seconds	40 on coil
		10	8 " "
		20	6 " "
		30	5 " "
		40	4 " "
		1 min	4 " "
		1 " 30 seconds	3 " "
		2 "	2 " "

No coloration of plate.

gas rapidly formed
precipitate with discoloured slightly

reception plate darkened.

Solution #37 - Lactic & Phosphoric acids

Battery cell	Time	Deflection
32 Left not 35 Right primary	9:54:	5 on chep
	55	6 " "
	10:01	6
	seconds	178 on coil
	10	80
	20	50
	30	30
	40	23
	50	19
	60	16
	1 min 920 secs	16
	2 m	10
	2 m 4 1/2	8
	3 m	2

#44 - Barium Chloride

27 Left not 25 Right primary	10h 15'	6 on chep
	25 30"	4 " "
	25	3
	seconds	30 on coil
	10	5
	20	4
	30	3
	40	2
	50	2
	1 min	1

Gas given off a little
Positive for lack on hand slightly

A white precipitate formed very little for much

Cu + Cu

Solution #40 - chlor & Mag Sulphate

Back	Coil	Time	Deflections
25 left 23 right	Nothing	10:36	5 on strap
		1 min	12 "
			24 on coil
		10 "	12
		40	6
		50	1

Cu + Cu

30th Apr. 1885

Solution #34 - Oxalic Acid.

Back	Coil	Time	Deflections
37 left 33 right	not primary	8h 25'	15 on strap
		25' 10"	7
		37	4
		6 seconds	12 on coil
		10	7
		20	5
		30	4
		40	3
		1 min	2

#35 - Oxalic & Phosphoric acid

Back	Coil	Time	Deflections
	Nothing	8:45	12 on strap
		46	9 " "
		55	8 " "
		5 seconds	40 on coil
		10	32
		20	27 " "
		30	27
		40	20
		1 min	14
		30	10
		2	7
		3	3

Gas given off
Both plates blackened

Remarks

Positive plate blackened
negative plate giving off gas freely.

Both plates black after discharge
liquid turned pearish in color.

Both plates giving off gas
a faint cloudy precipitate from
positive plate - pearl in color.

Solution #36 – Tartaric acid

Battery	Cell	Time	Deflection	
				Cu + Zn
22	Not	9h 07'	.5	on chop
22	primary	08	4	" "
		17	3	"
		5 seconds	30	on coil
		10	20	
		20	13	
		30	7	
		40	4	
		50	3	
		1min	2	

#38 – alum

Battery	Cell	Time	Deflection	
				Cu + Zn
22 sup	Nothing	9h 25'	7	on chop
22 left		26	5	"
		35	4	
		6 seconds	25	" coil
		10	15	
		20	9	
		30	5	
		40	2	
		50	1	

#39 – alum & Phosphate

Battery	Cell	Time	Deflection	
	Nothing	9h 37	9	on chop
		38	6	"
		47	3	"
		3 seconds	50	on coil
		10	20	
		20	6	
		30	3	
		40	2	
		50	1	

Slight amount of gas
no coloration

Positive plate blackened
Gas from negative
no coloration
Bubble sticks on kind on electrodes

same as previous test

Cu 4 cm 11th May. 1885

Bromide of Potassium

No.	Cell	Time	Deflection
27	nothing	9h 40'	10 on strip
927		40' 15"	8 " "
		50'	2 " "
		seconds	6 on cu'l
		10 "	4 " "
		20	3 " "
		30	1 " "
		40	1 " "
		50	1 " "
		60	1 " "
		1 min & 10"	0 " "

Potassic Carbonate Cu 4 cm

	Nothing	9h 55'	3 on strip
		10 05	2 " "
		seconds	4 on cu'l
		10 "	2 " "
		20 "	0 " "

Permanganate of Potash

	Nothing	10h 12'	15 on strip
		12 30	10 " "
		22	
		seconds	7 on cu'l
		10 "	4 " "
		20 "	2 " "
		30 "	1 " "
		40 "	0 " "

57

Remarks

Gas evolved from one electrode and a white coating formed on other. No precipitate perceptible.

Coating remains after discharge

Green flaky deposit formed on one upper & is precipitated by passing.

No action on plates.

1899	Bicarbonate of Potash			Carbon
Date	Cell	Time		Deflection
23 left	not a primary	10h 25'		3 on strip
22 right		35		3 "
		3 seconds		10 on coil
		10 "		4 " "
		20 "		2 " "
		30 "		1 " "
		40 "		1 " "
	Sulphate of Copper	Cyanide of Potassium		
	nothing	10h 43		2 on strip
		52		0 " "
		7 seconds		7 on coil
		10		5 " "
		20		3 " "
		30		1 " "
	Sulphate of Iron			
21 left	nothing	10h 55'		2 on strip
22 right		11 05		2 " "
		5 seconds		50 on coil
		10		30 " "
		20		15
		30		10
		40		7
		50		5
		1 min		5
		1 " 30 secs		4
		2		2
		3		1

Green flaky deposit & precipitate a little gas from each plate.

Gas from electrode.

Plates stained black very little gas evolved

Battery	CCCl	Time	Deflections
		16 Kempen Cab & Blacend coils	Cu & Cu
20 right 19 left	Neta primary	11:24	2 on chap
		:34	1 " "
		Seconds	
		10 "	2 on coil
		20 "	1 " "
		30 "	1
		40 "	0 " "
	Nothing	11:38	6 on chap
		39	5 " "
		48	
		seconds	on coil
		10 "	40 " "
		20 "	28 " "
		30 "	20 " "
		40 "	14 " "
		50 "	9 " "
		1 min "	6 " "
		30 secs	2 " "
	Hope - exhibits of order		
20 right 20 left	Nothing	11:50	2 on chap
		12:06	2 " "
		5 seconds	9
		10 "	7
		20 "	5
		30 "	3
		40 "	2
		50 "	1
		1 min "	1

Remarks

201 /

Gas from one plate
other plate stained slightly

Plates stained
very little gas evolved

Fresh deposit on one plate on cu
a precipitate from it

~~Test~~ Semi-Prom

Solution #10 - Glacial Phosph. Acid

Battery	Cell	Time	Deflections
19 right 19 left	into primary battery	1:05 amin	13 on strip (strip)
		:06 "	11 " "
		:15	9 "
		5 seconds	12 "
		10 "	10 " coil (discharge)
		20 "	9 " "
		30 "	8 " "
		40 "	6 " "
		50 "	5 " "
		1 min	5 " "
		30 sec	4 " "
		2 "	3 " "
		3 "	3
		4 "	2

#11 Hyp. Cyd. of Bismuth & placed phos. acid

18 left 19 left	nothing	1:22	22 on strip
		33	21 "
		5 seconds	15 on coil
		10	7
		20	3
		30	1

#14 Ferric-Cyanide

14 left 13 right	nothing	2:03	7 on strip
		:30	6 "
		13	6 "
		5 seconds	5 on coil
		10 "	3
		20	3
		30	2
		40	2
		50	1

Remarks

Gas given from both electrodes.
Electrodes both turn a red-brown color.

Dark deposit on both plates -
Turned liquid dark.
Very little gas evolved

a little gas given off
Dark colored deposit on both plates
Solution not discolored

204 #15 - Boracic acid.

Back	Cell	Time	
16 left 13 right	Nothing	2:20	0 on shelf
		30	0 " "
		45 seconds	1 on coil
#18 - Phosphoric Acid			
	Nothing	2:34	2 on shelf
		36½	1 " "
		40	" "
		7 minutes	13 on shelf
		20	11
#19 Iodic acid			
16 left 15 right	Nothing	2:54	0 on shelf
		3:04	
		7 seconds	12 on coil
		10 "	8
		20 "	6
		40 "	3
		1 min	2
# Sulphate Zinc + Sulphate Iron			
480 R.	1°	2.39 A.M.	14° in strap
		49	
		7 seconds	20 on Coil
		10	19
		20	16
		30	12
		1 minute	9
		2	7
		3	6
		4	5
		5	4
		8	3
		12	2
		15	2

Plates nearly uncharged

Plates slightly discolored

Nothing in plates.

#May 6, 85 No gas, or coloration either on charging or discharging.

Discharges in reversed direction

206 H

Battery	Cell	Time	Deflection
33 left 34 right	Nothing	2:30 Pm.	9 on shelf
		:30 : 30	7 " "
		40	7
		5 seconds	From coil
		10 "	9
		20 "	9
		30 "	6
		40 "	4
		50 "	3
			2
4 oz acetic acid	Nothing	2:46	8 on shelf
		56	8 " "
		8 seconds	30 " coil
		10 "	25 " "
		20 "	24
		30 "	23
		1 minutes	23
		2 "	23
		3 "	23
		4 "	22
		5 "	22
		6 "	22
		7 "	21
		8 "	21
		9 "	20
		10 "	20
		11 "	19
		12 "	18
		14 "	17
		16 "	16
		18 "	14
		20 "	11
		22 "	7
		24 "	3
		25 "	0

Gas given off rapidly from negative electrode.

Gas given off freely from one pole

Faint coloration of plates

Both plates give off gas equally during discharge

Plates stained black

21 acetic, Prop. acetic, glacial 1 aq

Battery	Cell	Time	Deflection
35 left 39 right	Nothing	3h 30'	14 on strip
		40	9 " cell
		50	6 " "
		5 seconds	10 on cell
		10	8
		20	6
		30	5
		40	4
		50	3
		1 min	3
		1 " 30"	3
		2 "	

23 strong ammonia acid

38 left 40 right	Nothing	3h 50'	24 on strip
		50 30"	12 "
		4h 00	8 "
		5 seconds	50 on cell
		10	46
		20	41
		30	39
		40	37
		50	35
		1 min	34
		1 " 30"	32
		2 "	30
		3 "	28
		4 "	24
		5 "	21
		6 "	18
		7 "	15
		8 "	13
		9 "	12
		10	10

Gas given off equally from both electrodes.

Little gas given off during discharge

Gas given off in small quantities.

Dark deposit

very little gas given off during discharge

#39 Lower acid

Fe + Fe

Bat.	Cell	Time	Deflection
40 right 38 left	Nothing	4:27	20 on strip
		:28	18 " "
		:37	15 " "
		4 secs	40
		10 "	23
		20	13
		30	8
		40	6
		50	4
		1 min	2

#28 – Pyro. Gallic acid

	1° deflection	4:46	20 on strip
		:47	19 " "
		:56	16 " "
		4 seconds	12 on coil
		10 "	6 " "
		20 "	3 " "
		30 "	2
		40 "	1

#35

30 left 31 right	Nothing	5:01	9 on strip
		:02	7 " "
		:11	
		seconds	
		10 "	
		20	
		30	

Gas given off freely.
Whitish precipitate.

Very heavy precipitate, forming a thick gummy mass, pink in color.

Gas given off freely.

Purplish coloration of plates.

Gas freely evolved

25 - Citric acid

50 left 5-2 right	Nothing	10:11 am.	9 on strip
		12 "	8 "
		21 "	8 "
		5 seconds	2 on coil
		10	1
		20	1
		30	0

34 - Oxalic acid

	1° defl.	10h 31'	15 on strip
		30	14 " "
		41	07
		4 seconds	2 on coil
		10	15
		20	9
		30	5
		40	4
		50	3
		1 min	1

30 - Tartaric acid & Phosph. acid Glacial

39 left 38 right	Nothing	10:59	18° on strip
		59 30	17 " strip
		11:09	15 " "
		5 seconds	7 on coil
		10 "	4
		20 "	2
		30 "	1
		40 "	0

Gas given off freely from the negative electrode.

Greenish color given to solution

Decided green color given to solution

Gas given off lightly.

Plates stained black

Gas given off very freely from negative electrode

#31 – Glycerine + Silt (sacc) 7c & 3c			
36 left 36 right	Nothing	11:25 :35 5 seconds 10	1/2 on chip 1 on coil 0
#32 – Glycerine + H_2SO_4			
44 right 40 left	1/2 0	11:53 :56 12:03 5 seconds 10 20 30 40	29 on chip 14 " " 13 " " 1 on coil 1 1 1 0
#35 – Oxalic + Phosph. acid			
37 left 37 right	Nothing	12:10 Pm :10:30 :20 5 seconds 10 20 30	22 on chip 19 " " 11 2 on coil 4 1 0
#33 – Glycerine + Phosph. acid			Blue.
	Nothing	12:29 :39 5 seconds 10 20 30	3 on chip 2 " " 6 on coil 2 1 1

No chemical action at first 15

Gas given off lightly from the negative foil

No staining

Gas from negative electrode given off very rapidly. From positive fairly.

Gas given off rapidly from – and first given off from + very little stain

Gas evolved

No deposit

#36 – Tartaric acid

36 left 35 right	Nothing	12:45 P.M.	18 on strip
		:46	9 " "
		:55	9 " "
		5 seconds	3 on card
		10	2
		20	1

#37 – Tartar. acid + Phosp. acid

	Nothing	1:03	20 on strip
		:04	17 " "
		:13	14
		5 seconds	7 on card
		10	5
		20	4
		30	4
		40	3
		1 m	2

#38 – alum

32 left 34 right	4° defl.	1h:21	14 on st.
		:22	18 " "
		31	13 " "
		5 secs	12
		10	05
		20	0
		30	2
		40	4

Positive plate darkened
negative no gives of gas freely.

Gas given off as before

Dark coloration on both plates

Gas given off freely from negative wire
negative pl. blackened
positive yellowish coating.

#39 – Alum & Phosp. acid

30° left 32	1° deft	1h 36'	19° Ch
		30	18° "
		46	15
		4 seconds	14 cont
		10	8
		20	7
		30	6

#40 – Alum & Mag. Phosp.

	Nothing?	1h 50'	13 Ch.
		51	11
		2h 00	10
		5 seconds	8 cont
		10	8
		20	2
		30	-1
		40	-1

#44 – Barl.

28° left 28 right	1°	2h 04	14 strong
		05	13
		14	12
		5 seconds	31 cont
		10	20
		20	14
		30	10
		40	7
		50	5
		1 min	4
		1 " 30	4
		" " 30	3
		2 min	2

Gas given freely

Redness most decided [illegible]

Gas given after lapse

Reddish deposit on position [illegible]

Position pl. discolour

Vegetation given [illegible]

Green cloudy sh. sweat, or precipitate heavy

Frothy mass at surface

#45 Barb. + Olin cl.			
26 left 27 right	2° deff	2h 24'	15 slow
		25	13 "
		34'	13 "
		4 seconds	10 cool
		20	8
		30	6
		40	4
		50	3
		1 min	2
#50 Cart of Potass.			
34 left 34 right	1°	3h 34'	6 slow
		44	5
		seconds	9 cool
		10	7
		20	6
		30	5
		40	4
		50	3
		1 min	2
#51 Bi-carb of Potass			
	1°	3h 48'	8 slow
		49	8
		58	8
		seconds	10 cool
		20	10
		30	9
		40	7
		50	5
		1 min	4
			3

Gas evolved freely
Yellowish brown ppt.
Water blackened

Gas evolved.
Heavy white ppt.

Gas from neptum potass
and from bicarbonate freely
White of heavy ppt. immediately formed
falling from potash.
Solution turned greenish

22	22 #68 –	Nothing	K_2SO_4 (Sulph of Potash)	
29 night			4° 01	12 on chip
29 left			02	10 " "
			11	20 " "
			3 seconds	20 on coil
			10 "	12
			20 "	7
			30 "	5
			40 "	4
	#53 Bicarb of Potass.			
			10° 4° 15	18 on chip
			16	15 " "
			25	13 " "
			3 seconds	9 on coil
			10	7 " "
			20	7 " "
			30	6 " "
			40	6 " "
			1 min	6
			2 "	3 " "
	#54 – Bromide of Potass.			
25 left		Nothing	4° 28	12 on ch
24 night			29	10 "
			38	10
			5 seconds	19 coil
			10	11
			20	6
			30	4
			40	2
			50	1

Gas given off

K chlorate deposited of P.

Precipitated in a stream & which flows bottom ; etc.

Gas given off

No oil globules

Gas given off

Globules underneath

JC & Br

55 – Permanganate of Potash

25 left	Nothing	4:42	04 ster.
26 right		:43	03
		:52	03
		45 seconds	17 coil
		10 "	10
		20	7
		30	5
		40	4
		50	3
		1 min	3

56 Sulphate – Granules of Pot. Fe.

	Nothing	5:01	10 or ster.
		:02	7
		:10	9
		35 seconds	35 or coil
		10	21
		20	14
		30	8
		40	5
		50	4
		1 min	3
		1 " 10	3
		1 " 20	2

Very little chemical action

Gas given off freely

Black p.p. formed

Stage Batteries — Fe 4 Fe

7th May 75

4.58 — Approximate of Potass

Battery	Act	Time	Depth
46 left	Nothing	9:14	26 on chip
45 right		15	24 " "
		24	16 " "
		5 seconds	70 on crib
		10	50
		20	27
		30	18
		40	13
		50	11
		1 min	10
		1 " 10 secs	9
		1 " 20 "	9
		1 " 30 "	8
		1 " 40 "	8
		2 "	7

5.07 — Approximate of Potass.

Battery	Act	Time	Depth
30 left	Nothing	9:37	9 on chip
32 right		:50	7 " "
		:44	6 " "
		4 seconds	40 on crib
		10	40
		20	24
		30	16
		40	10
		50	7
		1 min	6
		1 " 10 secs	6
		20	5
		30	5
		40	5
		50	4
		2 min	4
		10	4
		20	3

Remarks

Dense, black, cloudy precipitate immediately formed. Does not adhere to electrodes.

Very little gas formed.

No stirring, electrodes [illegible]
Positive " [illegible]

No precipitate — remained first
Cloudy p.p. formed later.

228 3. – Red flood Fe 4 7c

31 left 2° left
33 right

17	30"	-36
	40"	-35
18		-34
	10"	-32
	30"	-30
	50"	-28
19		-27
	20"	-26
	40"	-24
20		-21
	20"	-18
	40"	-16
21		-14
	20"	-13
	40"	-12
22		-10
	20"	-9
	40"	-8
23		-7
	20"	-7
	40"	-4
24		-3

9h	54 sec	-26 on its left
	55	-8 " "
10h	04	-6 "
6 seconds		+7 on east
10 "		+4 " "
20		+2
30		0
40		-2
50		-4
1 min		-5
" "	10 sec	-6
1 "	30 "	-7
1 "	50 "	-8
2 "	10 "	-9
2 "	30 "	-11
2 "	40 "	-12
2 "	50 "	-13
3 "		-16
3 "	20 "	-19
3 "	30 "	-22
3 "	40 "	-25
3 "	50 "	-31
4		-42
4 "	10 "	-70
4 "	20 "	-90
4 "	30 "	-80
4 "	50 "	-70
5		-60
5 "	20"	-55
5 "	30	-52
5 "	50	-54
6	10	-53
	30	-50
	50	-48

229

Geo formed at both plates
Reflection plate has black deposit

Solution becomes very hot.
Decanting a new solution for both plates
a bit better at 45 also a Fe mirror

11'	50"	-48
12'		-48
	20	-47
	40	-46
13'		-46
	40	-48
14		-47
	20	-51
	30	-44
	40	-44
	50	-45
15'		-46
	10	-50
	20"	-53
	30"	-49
	40"	-48
	50"	-45
16		-44
	20"	-42
	50	-41
17'		-42
	20"	-38

7 min		-47
	20	-46
	30"	-44
	40"	-43
8	50	-42
		-41
	10	-42
	20	-44
	30	-45
9	50	-46
		-47
	10	-47
	20	-48
	30"	-50
	40"	-48
10		-50
	20"	-48
	30	-46
	40	-47
	50	-52
11		-54
12	40	-51
	30	-51

230 #6 – Manganese sulphate

35 left 35 right	Nothing	10:46	13 on strip
		47	18 "
		56	9 "
		11 seconds	72 " strip
		10	60
		20	48
		30	36
		40	30
		50	24
		1 min	18
		10	15
		20	12
		30	8
		40	6
		50	4
		2 min	3
		10	3

4 Manganese chloride			
34 left 34 right	1° defl	11h 39'	19 on strip
		40	15
		49	10
		10 secs	50 on coil
		20	20
		30	60
		40	52
		50	45
		1 min 6	35
		10	26
		20	18
		30	14
		40	12
		50	10
		2 min 50	9
		10	7
		20	7

Gas given off rapidly
Precipitate formed which partly colors

Red cloudy ppt formed
Part rises to surface

Very little gas given off
Yellow gelatinous substance rises to surface

8 – Phosphoric acid

33 left	Nothing	12h 55	16 on strip
35 right		55 30	14 " "
		1h 05 Pm	10 " "
		0min 30 seconds	
		10	5
		20	6
		30	5
		40	4

9 – $KmnO_4$ + Fe_2SO_4

	Nothing	1h 10	15 on strip
		11	14 " "
		20	11 " "
		0min 30 secs	55 " "
		10	30 on coils
		20	20 " "
		30	16 " "
		40	14 " "
		50	13 " "
		1min	13 " "
		10	12 " "
		20	12 " "
		30	11 " "
		40	11 " "
		50	11
		2min	10 " "
		10	10 " "
		20	10
		30	10
		40	10
		50	9
		3min	9
		10	9
		20	9
		30	8

Gas evolved
Plates blackened
No coloration of fluid

Very little gas given off
Platinum plate blackened
Fluid " pink tinged
Little blackness of

Porous & Carbon

Plates 1/8 inch apart instead of 1/4 inch, as in previous metals

3 – Red Fluid ($K_2Cr_2O_7 + H_2SO_4 + aq.$)

Battery	Cell	Time	Cell
34 right 34 left	Untouched	1h 58 P.M.	17 on chart
		59 "	14 (circuit)
		2h 08 "	10m "
		0min 3 secs	2 on coil
		10	1 (circuit)
		20	1
		30	1
		40	1

6 – Ammonium Sulphate

Battery	Cell	Time	Cell
26 right 26 left	1 defl. (circuit)	2h 14	5 on chart
		14½	3 "
		24	2
		0min 6 secs	70 on chart
		12	55
		22	46
		32	36
		40	29
		1min 50	26
			21
		10	19
		20	17
		30	15
		40	13
		50	11
		2min	10
		10	9
		20	8
		30	7
		40	7
		50	6

Remarks

Fluid darkened in colour

No visible change in Porous

Gas rises from cells in bubbles.

#7. Ammonium chloride C4L

29 right Nothing 2h

29 left

	29'	6
	30	5
	39	3
omit	50 seconds	on omit 6
	10	80
	20	60
	30	45
	40	34
	50	27
1 min		22
	10	16
	20	15
	30	13
	40	12
	50	11
2 min		10
	10	9
	20	8
	30	8
	40	7
	50	7

Gas from neptune.
little from jupiter

#8 - Phosphoric acid

2h (omit)

2h	49'	7 on strong
	50	4 " "
	59	3 " "
	00 seconds	12 on omit
	10	8
	20	5
	30	4
	40	3
	50	2
1 min		2
	10	1
	20	1

Gas from liquid ammonia

238 [illegible] $MnSO_4 + ZnSO_4$ C+C

20 left nothing
30 m/st

3h 3'	5 ok
13	3
cis	cuil
10	110
20	80
30	65
40	55
50	47
1 min	39
10	35
20	31
30	29
40	25
50	23
2 min	21
10	20
20	19
30	18
40	17
50	16
3 min	15
10	14
20	13
30	12
40	11
50	11
4 min	10
10	10
20	10
30	9
40	9
50	9
5 min	9

239

Was only given off from one plate
[illegible] observed a [illegible] [illegible]

240 #10 Sheet Phos. acid C & C

29 left	10 left	3h	25'	6 strip
29 right			35	6
			5 secs	50
			10	44
			20	30
			30	26
			40	22
			50	20
		1 min		19
			10	18
			20	18
		2 min		15

#11 Hydrogen, Oxygen & Elec. Phos. acid

30 left	Nothing	5h	12'	10 on strip
31 right			13	5
			22'	5
			6 secs	40 on wire
			10	23
			20	13
			30	10
			40	7
			50	5
		1 min		4
			10	3
			20	3
			30	2
			40	2

Gas given off for — minutes

a little gas given off

Apparently a black deposit on negative carbon after discharge

#19 – Soda acetate

31 left 30 right	Nothing	5h 34'	5 on chg
		35	4 "
		44	3 "
		2 secs	30 on sample
		10	18 on cell
		20	9 " "
		30	6 " "
		40	4
		50	4
		1 min	3
		10	3
		20	3
		30	2
		40	2

Brown coloration point to oxalate
very little pas[illegible]

8th May. 1895

#10 Solution — Phosphate of Soda

Battery	Coil	Time	Reflections
38 right 36 left	nothing	9h 11' am	6 on strong
		12	4 " "
		21	8 " "
		5 secs	30 on coil
		10	21
		20	8
		30	5
		40	3
		50	3

#20 - acetic acid

Battery	Coil	Time	Reflections
35 left 36 right	2° deff.	9h 34'	3 on strong
		44	3 " "
		5 secs	65 on coil
		10	27 " "
		20	18 " "
		30	13
		40	10
		50	8
		1 min	7

#21 - acetic + phosphate soda

Battery	Coil	Time	Reflections
nothing		9h 50	6 on strong
		10h 10	4 " "
		5 secs	31
		10	22
		20	15
		30	12
		40	10
		50	9
		1 min	8
		10	7
		20	6
		30	5
		40	4

Stop point [illegible]

[illegible]

No [illegible] a little carbon [illegible]

Stop point off [illegible] electrodes.

24b #14 - Lactic - equivalent

32 left
35 right

Nothing

10" 9 - - - - 5 strong
19 - - - - 3 "
5 secs 30 on cold
10 - - - 19 "
20 - - - 14 "
30 - - - 10
40 - - - 7
50 - - - 6
1 min - - - 5

No pain off right

#16 - Hemipinic Cab & Thoracic Acid

Nothing

10:25 - - - - 3 on strong
35 - - - - 1 -
5 secs - 20 - cold
10 - - - 11 -
20 - - - 7 -
30 - - - 5 -
40 - - - 4 -
50 - - - 3

No visible change in Urine

#15 - Bracic Acid

30 left
33 right

10:39 - - - - 1 on strong
49 - - - - 0 " "
3 secs - 18 on cold
10 " - 5
20 " - 4
30 " - 3
40 - - - 2
50 - - - 2
1 min - - - 1
10 - - - 1

No pain off

C & C

#23 - Arsenious acid

31. left 33 W/H	Nothing	10h 45'	0°	on ship
		50	0°	" "
		4 secs	12	on coil
		10	9	" "
		20	7	" "
		30	6	" "
		40	5	" "

#24 - $Zn SO_4$ + $K_2 SO_4$

	Nothing	11h 02'	10	on ship
		12	4	" "
		35 secs	150	on coil
		10	80	" "
		20	50	
		30	35	
		40	29	
		50	23	
		1 min	19	
		10	17	
		20	16	
		30	15	
		40	14	
		50	13	
		2 m	12	
		3 m	9	

#25 - Citric acid

31. left 31 W/H	1° defl	11h 22	3	on ship
		32	1	" "
		6 secs	45	on coil
		10	11	
		20	7	
		30	5	
		40	4	
		50	3	
		1 min	3	

Small quantity of [illegible]

Small quantity on [illegible]

Gas accumulates on [illegible] pole

C & C

#28 – Pyro-pollic acid.

31 left Nothing 12h 01 - - - - 2 on strip
33 right 11 - - - - 1/2 " "
SDECS - 15 on coil
10 - - - 9
20 - - - 6
30 - - - 4
40 - - - 3
50 - - - 3

#29 – Tannic acid Nothing 12h 1
14 - - - 1 on strip
27 - - - 0 " "
HDECS 11 on coil
10 - - 8
20 - - 6
30 - - 4
40 - - 3
50 - - 2

#30 – Tannic acid + Phos. Acid Sol.

31 left Nothing 12h 36 Pulse 6 on strip
33 right 46 " - 3 " "
5 Seconds - 64
10 - - - 47
20 - - - 27
30 - - - 14
40 - - - 7
50 - - - 6
1 min - - - 5
10 - - - 5
20 - - - 4
30 - - - 4
40 - - - 4
50 - - - 4

Third aparagus
Plates not stained

a little res coming

Lungs given off gases from respiration
electricity,
Method deposit on + [illegible]

C & C

#31 Glycine & Common Salt.

	Nothing	12h	51 P.M.	1/2 defl. strong
		1	01 "	0
			6 secs	4 on coil
			10	3
			20	3
			30	2

#32 Glyc. & Sulph. acid

31 left	3° defl.	1h	7	5 on strap
33 right			17	3
			5 secs	10 on coil
			10	5
			20	3
			30	2
			40	2

#33 Glyc. & Phosp. acid. Tube.

	Nothing	1h	35	2 on strap
			45	1 " "
			4 secs	7 on coil
			10	4
			20	3
			30	2

#34 - Oxalic acid

30 left	Nothing	1h	45	8 on strap
31 right			50	5
			6 secs	13 on coil
			10	7
			20	4
			30	2
			40	2
			50	1

No action —

Hydrocarbon gas [illegible]

[illegible] from both [illegible] & [illegible] from negative.

[illegible] from neg [illegible]

[illegible] from both [illegible] from negative plate

No receiptor

Green coloration around [illegible]

#35 – Oxalic acid + Phosph. acid

25 left	1° defl	2h	2'	5 on strip
26 right			12	4 "
			5 secs	40
			10	30 on coil
			20	18
			30	13
			40	11
			50	9
		1 min	6	7
			10	6

Gas from both acids

#36 – Tartaric acid

	Nothing	2h	17'	2 on strip
			27	2 "
			6 secs	35 on coil
			10	26
			20	19
			30	14
			40	12
			50	10
		1 min		8

#37 Tartaric + Sheet Ph. acid

			30'	5
	Nothing	2h	30'	4 on strip
			40	3 "
			5 secs	20 on coil
			10	55
			20	34
			30	24
			40	16
			50	12
		1 min		10
			10	9
			20	8
			30	8
			40	7

Gas in small quantity [illegible] precipitate of tartar

Gas from both [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

#38 – Alum.

28 left not a	2h	44'	4 on step
24 μ.μ.m. primary		54	3 "
		5 secs	60 on curve
		10	26
		20	14
		30	10
		40	8
		50	7
		1 min	6
		10	5

#39 – Alum & Phosph. acid

1° defl	3h	01'	3 on step
		11	3 " "
		5 secs	33 on curve
		10	24
		20	17
		30	14
		40	13
		50	12
		1 min	11
		12 "	7

#40 Alum & Magn. Sulph.

Nothing	3h	24'	7 on step
		34	8 " "
		6 secs	60 on curve
		10	50
		20	30
		30	31
		40	27
		50	23
		1 min	20
		10	18
		30	12
		2 min	8
		3	5

With gas given off.
[illegible] deliquescence.

Gas given off [illegible]
[illegible]

Gas freely liberated [illegible] plate

0 1 2

44 Barium Chloride (Barba)

25 left
27 right

Nothing

3h	34'	3 on [illegible]
	49	1 "
	50	50 on [illegible]
	10	28
	20	16
	30	11
	40	8
	50	6
1 min		15

45 – Barium chl + Trans. Chl.

1 deg. left

3h	54	8 on check
4h	04	4 " "
	7 sec	13=0 on coil
	10	130 "
	20	70 "
	30	40
	40	32
	50	26
1 min		21
	10	20
	20	19
	30	18
2 min		12
	30	8
3m		6
	30	5
4m		5
	30	4

already pp [illegible]
[illegible] pole. [illegible]

very little [illegible]
[illegible] all [illegible] on [illegible]

C & C.

#46 – Sulphate of Iron

16 left	Nothing	4h	11' --- 3 on strip
24 right			21' --- 2 " "
			30 ass 72 on crib
			10 --- 64
			20 --- 49
			30 --- 40
			40 --- 32
			50 --- 26
			1 min --- 22
			10 --- 19
			20 --- 17
			30 --- 15
			40 --- 14
			50 --- 13
			2 min --- 12
			10 --- 11½
			20 --- 11
			30 --- 10
			40 --- 10
			50 --- 9
			3 min --- 9

#51 – Biciate of Potass.

31 left	Nothing	4h	43' --- 3 on strip
32 right			53 --- 3 " "
			5 ass 20 on crib
			10 --- 12
			20 --- 6
			30 --- 5
			40 --- 4
			50 --- 4
			1 min --- 3
			10 --- 3
			20 --- 2

Very little gas given off

No deposit

C. & C. [illegible]

#52 – Sulphate of Potass

33 left
36 right

1° deff

4th 57' – 44 on thumb
5th 07' – 8 "
5 secs – 41 on coil
10 – – 25
20 – – 13
30 – – 11
40 – – 8
50 – – 7
1 min – – 6
10 – – 6
20 – – 5

#53 – Bisulphate of Potass

1° deff.

5th 14' – 11 on thumb
24 – 8 " –
5 secs – 35 on coil
10 " – 21
20 " – 13
30 " – 8
40 " – 6
50 " – 4
1 min – – 3
10 – – 3
20 – – 3

Gas from both plates – faint from positive plate
Pretty deposit on both plates

Gas from negative
Copper field in mixture

264 #54 – Bromide of Potass.

9th May 1881

55 pos	Nothing	9h 02'	13	on string
55 left		03'	11	"
		12	9	"
		6 secs	130	on card
		10	70	"
		20	57	"
		30	24	"
		40	16	"
		50	12	"
		1 min	10	"
		10	8	"
		30	5	"

Gas given off freely from negative pole.

Little deposit on platinum.

55 – Permanganate of Potash

51 left	2° diff	9h 16'	7	on string
55 right		18	4	"
		5 secs	55	on card
		10	36	
		20	24	
		30	17	
		40	14	
		50	12	
		1 min	10	
		30	7	

Very little gas evolved

56 – Sulphate Cyanide of K

	Nothing	9h 35'	12	on string
		45	10	"
		5 secs	50	on card
		10	33	"
		20	18	"
		30	13	"
		40	9	"
		50	6	"
		1 min	5	"
		10	5	"
		30	4	"

Gas freely given off at negative electr.

#5-7 – Fumo-agaricin of Potass.

53 left	Nothing	9h	55'	20 m Stop
55 right			56	11 " "
		10h	05	8 "
			5 secs	70 m oil
			10	41 " "
			20	26 " "
			30	22 " "
			40	18 " "
			50	15 " "
			1 m	13
			10	11 " "
			20	10 " "
			30	9
			40	8 " "
			2 m	7

#5-8 – Hydro-sulphate of Nitro.

48 left	1° defl.	10h	10	15 m Stop
52 right			11	14 " "
			20	13 "
			5 secs	552 m oil
			10	28 "
			20	19
			30	15
			40	12
			50	10
			1 m	9
			10	8
			30	7
			2 m	5

– See pass of very nearly from the picture of Lake

– Fucinsh deposit on position of Lake.

– Has pass off light.

Solution #2 - Red Fluid -

Battery	Cell	Time	Deflection
49 left 53 right	1° deft. left	10h 50' am.	4 on st. left
		11h 00	3 " " "
		6 secs	66 on cell - right
		10	50 " " "
		20	20 " " "
		30	0 " " "
		40	12 " " " left
		50	14 " " "
		1 min	15 " " "
		10	15 " " "
		30	15 " " "
		2 min	16 " " "

#3 - Hypo-sulphite of Soda.

Battery	Cell	Time	Deflection
45 left 49 right	Hobson Primary	11h 06'	15 on st. - left
		07	15 " " "
		16	" " "
		6 secs	7 on cell - right
		10	3 " " "
		20	2 " " "
		30	1 " " "
		40	1 " " "
		50	1

Plates slightly stained
two gas given off

Dense Black cloud immediately formed around middle & upper parts of plates
Faint white cloud around lower part - Solution clear - saturated.
Gas from negative electrode.

#6 – Manganese Sulphate.

46 left 49 right	Resting	11h	21	18 on Thp
			26	15 " "
			31	12 " "
			7 secs	5 on Cond
			10	4
			20	2
			30	1
			40	1

Gas given off very rapidly from negative plate which becomes stained black. ✱ Coating falls off practically

#7 – Manganese Chloride

	Resting	11h	34	23 on Thp
			35	22 " "
			36	21 " "
			44	16
			8 secs	90 on Cond
			10	50
			20	15
			30	6
			40	3
			50	1

Gas given off very rapidly from negative plate. Plate blackened. Water cloudy at bottom.

Water cloudy p.p. extends to top

#8 – Phosph. Acid Glacial

36 left 40 right	5 right	11h	45	3 on Thp
			50	1 " "
			5 secs	18 on Cond
			10	5
			20	3
			30	3
			40	3
			50	2

Negative plate darkened. Negative " gives off gas.

27 L 49 - Mn SO4 + Zn SO4

45 left 52 right	Nothing
14 minutes	43
15	42
16	40
18	37
20	37
22 [illegible]	37
24	36
25	30
26	26
27	18
28	15

12:10 P.M.	230 on strip left
11	180
21	155
5 PM	160 on carbon right
10	160
20	150
30	145
40	140
50	135
1 PM	125
10	115
30	110
50	105
2 PM	100
30	100
3 PM	100
30	100
4 PM	97
30	96
5 PM	90
30	75
6 PM	70
30	65
7 PM	60
30	55
8 PM	50
30	50
9 PM	49
30	48
10 PM	46
11 PM	45
12	44
13	44

Small granular ppt set free at negative pole.

Plate darkened.

Negative plate blackened on discharging

Deposit on reverse lumps from top.

" very soft or spongy

Monday 11th May

10 – Glass. Phosp. and Sn & Sn

Battery	Cell	Time	Defl^n
45 left 50 right	1° left	9^h 14' P.M.	31° def. left
		20	30 on stop
		24	25
		7 sec	26 on coil
		10	24
		20	23
		30	20
		40	18
		50	17
		1 min	15
		10	14
		20	13
		30	12
		2 min	10
		3 "	8
		4 min	6

11 – Hyp. ex. Manganese & Phosp. Bad El.
Nothing

		9^h 41'	4 on stop
		50	1 "
		3 sec	3 on coil
		10	2 "
		20	2
		30	2
		40	2
		50	2
		1 min	2
		10	2
		20	2

Positive pole blackened.
negative gives off hydrogen rapidly

negative pole blackened on discharge
Bismuth white deposit gives off on positive pole.

Very gas given off.
Poles blacken a green black colour.

14 – Ferric Cyanide

42 left 46 left	Nothing	10h – 8'	8 on strip	
		12	3 "	
		4 less	11 on coil	
		10	9 "	
		20	8 "	
		30	8 "	
		40	8 "	
		50	8 "	
		1m	8 "	
		30	7 "	
		2m	6 "	
		3m	5 "	

15 – Boracic acid

	Nothing	10h 19'	20 on strip	
		23	22 "	
		27	29 "	
		5 secs	1 on coil	
		10	1 "	
		20	1 "	
		30	0 "	

16 – Vanpin ruby – Slac. acid

	Nothing	10h 34'	3 on strip	
		44	1 "	
		5 secs	5 on coil	
		10 "	3 "	
		20 "	2 "	
		30 "	1/2 "	
		40 "	1	
		50 "	1	

Gas from negative pole
Both plates coloured
at first.

Gas from pole from neg. pl.
White cloud from positive pl.

very little gas from neg. pole

278 #15 – Phenylethylsulfonal

43 left	Nothing	10h	49'	1 on strip
40 right.			50	0 " "
			59	" "
			3 secs	6 on card
			10	3
			20	2
			30	1 " "
			40	1 " "

#19 – Methylsulfonal 1 gr.

	1° right	11h	01'	5 on strip
			30"	11 " "
			02	12 " "
			07	17 " "
			1 sec	1
			10	1
			20	1
			30	1

#20 – Acetone deid

	Nothing	11h	43'	10 on strip
			44	0 "
			53	
			4 secs	35 on card
			10	34
			20	30
			40	28
			50	23
			1 min	18
			10	16
			20	13
			32 min	8
			30	5

very little has given off

has given off freely.

has given off fairly from single pill.

282

S 12507

10 mg gold
150 mg silver

80

$$\begin{array}{r} 150 \\ 25 \\ \hline 750 \\ 300 \\ \hline 3.750 \end{array}$$

$$\begin{array}{r} 25 \\ 10 \\ \hline 250 \end{array}$$